

New owners for SA welding inverter manufacturer

The Reflex brand, SA's proudly South African manufacturer of inverter-based welding machines, has been bought by an empowerment consortium, consisting of Messrs Jomo Sono and Roy Fouché, Mrs Margaret Trunk and Dr Philip Theron – the inventor of the local welding inverter. The status of the entity was simultaneously changed to that of a private company and renamed Reflex Welding (Pty) Ltd.

The company's history goes back to 1981, when the operations of Reef Electrical (Pty) Ltd – a producer of welding equipment – were acquired by Coulson Engineering and the combined entity subsequently relocated into newly-purchased premises in Strijdom Park, Randburg. The primary business of the rejuvenated Coulson operation soon became the manufacture and repair of welding machines for the South African mining industry. At that stage, welding technology was still mostly transformer-based. The family-run Coulson Engineering made rapid progress in the local industry, soon adding a portfolio of welding consumables to its range so that customers could enjoy a more complete welding service.

In 1996, the Coulson brothers entered into a technology agreement with Dr Philip Theron, the latter having already developed and sold a limited range of inverter-based welding machines. Inverters use electronic switching devices to convert high voltage DC down to the required welding voltage. High-switching frequency provides an output dynamic response that allows much better control of the welding arc. It also allows much smaller transformers to be used which makes welding equipment far more portable. All welding processes – MIG, TIG, MAG, Stick and arc-



The new directors of Reflex Welding. Back row (from left to right): Vaughan Coulson, Dr Philip Theron, Roy Fouché. Front row: Jomo Sono and Margaret Trunk.

gouging – can be powered by inverters.

Due to the explosive growth in inverter equipment, and the resulting need to re-align its image, Coulson Engineering changed its name in 1998 to Reflex Welding cc. This operation has since become a market leader in the field of inverter welding technology, and the locally designed and manufactured inverter machines are now the industry standard within SA and across large parts of Africa.

“With the increase in investment, professional management and empowered ownership, associated with the acquisition, it is envisaged that Reflex Welding will continue its march of progress and ultimately become the foremost supplier of welding equipment in South Africa,” says Roy Fouché, the new MD.

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Reflex Welding's Strydom Park inverter manufacturing facility.



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Genrec's 'best cutting system in the world'

In a deal worth over R20-million, Goscor Arc has delivered and installed two state-of-the-art cutting systems at Murray & Roberts' steel fabrication company Genrec Engineering. The machines are being used specifically in the process of constructing boxed steel columns for power stations.

According to Genrec's Graham Hartley, the machines are critical to this process. "We did extensive research before making this purchase as they are working under inordinate pressure."



One of the high-tech Esab cutting systems bought by Genrec for use in the process of constructing boxed steel columns for power stations.

He says the machines were bought specifically for the plasma cutting of 40-60 mm plate up to 30 m long and oxy-fuel cutting of 60-150 mm plate with single-pass and double-bevel cutting.

Goscor Arc managing director Rob Pirie says the cutting systems are 6 m wide and 35 m long with the latest cutting-table technology including the most advanced air extraction system in the world. The gantries are fitted with Esab's world-renowned plasma bevelling head and triple-head oxy-fuel cutting system. Both machines are fitted with two Esab 400 plasma power supplies, Esab M3 PT36 cutting technology and Esab's latest Vision 55 CNC controllers. A full suite of Esab's Columbus software includes the latest innovation of enabling two plasma torches to cut simultaneously on one plate. "This is by far the best cutting system in the world," says Pirie. "The precision cutting heads and the ability to do straight and bevel cutting in one pass contribute to making it one of the lowest cost-per-metre operations

of its kind in the world. Also, with the ultra-advanced air extraction system, these machines protect the environment enhancing a safe and comfortable environment and adding considerably to productivity," he adds.

Members of the Goscor Arc team went to Germany to help set up Genrec's specification while locally, the company manufactured some components to ensure the machine was 100% fit for purpose. All training, both on the software and on machine operation was done by Goscor Arc.


Genrec has also taken delivery of four Esab twin-wire sub-arc A6 welding tractors complete with Esab LAF1000 power sources and PEH controllers, and eight Esab Miggy-track 3000 automated tractors complete with built-in wire feeder. These are being used primarily for joining the 40-50 mm plates and welding stiffener bars.

Hartley says that with Esab's high technology levels and Goscor Arc's trusted service delivery, his company has been able to reach the requisite productivity levels for this operation.

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Esab establishes local presence

Esab, a world leader in welding, cutting and related products, know-how and services, has established a southern African company in Johannesburg, Esab Africa Welding and Cutting (Pty) Ltd. The company will handle sales and distribution for the sub-Saharan African region. Headed by Chris Eibl, formally of Afrox, Esab Africa Welding & Cutting will continue to operate through its local distribution network, which now includes; Goscor Arc Welding, PK Welding & Robotics, Weldcom Distribution/Welders Warehouse and Earlyworx 12 T/A MPP Vereeniging.

Esab has over 35 state-of-the-art manufacturing facilities located around the globe and Esab Africa has full access to these facilities including the world renowned Process Centre in Gothenburg.

The company will import and manage the full spectrum of products in the Esab range including manual welding and cutting equipment, welding consumables, welding automation and cutting systems.

"Continuous development of methods, materials and know-how is being directed to meet the challenges posed by a diversity of industry sectors. Esab is organised to deliver efficient, high-productivity solutions to meet industry's requirements in a manner that exceeds expectations," says Eibl.

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Innovative joining for lighter bodywork

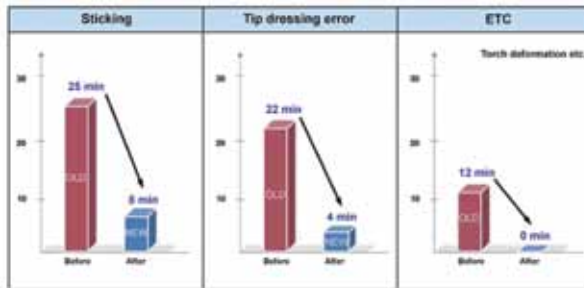
Hyundai has modified the CMT (cold metal transfer) process developed by Fronius International GmbH to suit its own needs. The bodywork production process increasingly involves joining parts made of different metals, in different thicknesses and with varying surface quality. This allows vehicle manufacturers to produce multifunctional components with the same or better functionality while maintaining a low overall weight.

Spatter arises during the conventional MAG welding of thin sheets when the droplet is transferred from the electrode into the weld pool. This affects downstream automated welding processes. The need to clean the welding torch nozzle and carry out time-consuming manual rework slows down automated production.



Depending on the model, more than 500 different components need to be welded together on the bodywork of a Hyundai vehicle, including multifunctional parts. Thermal CMT joining eliminates any bottlenecks during this process.

Members of Hyundai Motors' engineering team and Korea Aerospace University succeeded in isolating these production bottlenecks and have implemented the virtually spatter-free CMT process as a solution. During tests they identified the ideal welding and



Downtime is reduced by up to 80% (Courtesy Korea Aerospace University and Hyundai Motors).

brazing parameters and programmed the robot control software and welding systems on this basis. After successfully implementing their findings in practice on the production line, they were able to achieve stable metal transfer and significantly reduce spatter compared to conventional MAG welding, reducing downtime by more than 60%.

The CMT process offers two main benefits. The first is greatly improved gap bridgeability; with CMT you no longer have to worry about maintaining a narrow defined gap. In the past, complex multifunctional components with precision in tolerances often adversely affected the welding process leading to cumulative inaccuracies in size and shape between parts. However, much wider tolerances are now possible.

The second benefit is the almost total elimination of spatter. Torch nozzles stay cleaner for longer, even when welding in the overhead position, and robots can weld for longer without interruption. Other benefits include reduce heat input, which practically eliminates the risk of burn-through and reduces the frequency of ignition when welding coated steels. The narrow heat-affected zone means that the process lends itself well to MIG brazing on visible areas of the bodywork.

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Plasma cutting torch

The Thermal Dynamics 1Torch® RPT® plasma cutting torch is a replacement plasma torch that can be fitted to most plasma cutting power supplies. The same torch supplied with the new Cutmaster True Series, the 1Torch will with virtually all plasma cutting systems, whether high frequency, capacitor-discharge, torch start or moving parts (blow-back) start systems.

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First-of-a-kind manipulator for steel girder fabrication

“Cosira is doing a lot of steel-work for the Medupi Power station, girders – H-Beams or I-beams – for the Medupi Power Station,” says Herbert Abbott, technical director of PK welding and Robotics. “These are monstrous pieces of steel. The longest is 18 m and each one can weigh 18 tons.”

Cosira has just set up a 36 000 m² factory in Vulcania near Nigel to make these girders. “The difficulty they have is handling the material,” Abbott explains. “So we were contracted to design and build two machines for them. The first is a MIG/MAG beam assembly and tacking system and the second is a submerged arc beam welding system, both of which include very special manipulation systems.”

For tacking, PK has decided to use EWM-forceArc – a MAG process. “These are heavy single-sided tacks and in order for us to ensure a directionally stable arc, particularly when tacking the thicker web sections, EWM ForceArc was the obvious choice as there is no matching technology available on the

market today.” The innovativity of the system however, is more to do with materials handling than the welding.

Abbott describes the sequence of operation: “First, they put the web plate down with a crane. Then they put the two flanges down on-end alongside the web and remove the crane as it is not needed again until the tacking operation is complete,” he says. “Through an HMI, you enter the web sizes; thickness, height and length; and the flange height and thickness. The system then lifts the web to the correct position relative to the two flanges, accurately to within 1,0 mm,” he explains. “The separate plates are then hydraulically clamped together ready for welding.

“Two forceArc welding machines are mounted on a gantry system above the clamped girder. These automatically establish a home position, then, based on the welding settings entered into the same HMI, tack welding begins.” Once tacked, the girders are stored ready for transfer to one of the two submerged arc welding systems.

“Most girder manufacturers use fillet welding from both sides simultaneously. This does have a speed advantage but there is a risk of cold lapping on the web. Cosira is looking for a weld bead appearance equivalent to a rolled beam, with a nice concave profile, so they want to weld one of the four welds at a time with the beam tilted through approximately 45°,” Abbott says.

The system that PK Welding has developed allows the girder to be manipulated through every possible



Herbert Abbott, technical director of PK Welding and Robotics.

position so that the submerged arc welding heads can access all four of the seams to be welded. “We have designed a machine, exclusively for Cosira, with the first ever flip-flop table to manipulate girders for welding, which completely overcomes the need to reposition the girder with a crane,” claims Abbott.

The welding of the seams is being done using Esab tandem sub-arc welding systems. An Esab mechanical seam tracking system ensures the weld head position remains constant relative to the seam to be welded regardless of the position of the beam and if the beam is slightly cambered or bowed. “As a test, we ran this seam tracking system with a 300 mm height differential across the length of a beam. It followed perfectly and produced a beautifully consistent weld profile,” he adds.

“Our ability to design and build customised automated welding systems is what makes PK unique. We work with the local market, get close to the customer, are able to take standard equipment and then, by marrying these to custom built manipulation systems, we can fulfil the exact needs of our customers,” he concludes.



The first ever flip-flop table to manipulate girders for welding.

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